REMARKS

Claims 1-13 are pending in the application. Claims 9-13 have been withdrawn from consideration and claims 1-8 and are rejected. The rejection is made final.

Amendments

The Applicants cancel claims 9-13 that have been withdrawn from further consideration.

Background

Claims 1-8 are rejected under 35 U.S.C. § 103 as being unpatentable over U.S. patent application publication no. 2002/0000552 ("Morimoto") in view of U.S. patent application publication no. 2004/0137158 ("Kools"). Reasons given in the Office Action to support a rejection of the claims rely on an assertion that the prior art recognizes an equivalence between monomer ion beams and gas cluster ion beams (GCIB).

A telephone interview ("First Interview") was held on August 25, 2010 with Examiner Michael Band, supervisory examiner Alexa Neckel, and the undersigned attorney. During this First Interview the undersigned reviewed the Morimoto and Kools references and, referring to remarks given in the Applicants' response dated June 23, 2010, showed that the prior art does not recognize an equivalence between monomer ion beams and GCIB but instead recognizes them as being significantly different. An agreement was reached that the prior art does not show these two types of beams are equivalent. Having reached this agreement, the undersigned concluded the rejection of the claims should be withdrawn pending the outcome of further examination. Examiner Band indicated he would conduct a further search of the prior art.

On September 3, 2010 Examiner Band sent to the undersigned attorney an informal communication including a copy of Kitani et al., "Incident angle dependence of the sputtering effect of Ar-cluster-ion bombardment," Nuclear Instruments and Methods in Physics Research, 1997, pp. 489-492 ("Kitani") and discussed it briefly in a telephone interview ("Second Interview") that day. The undersigned pointed out that Kitani is consistent with other prior art the Applicants have disclosed that teach away from what is claimed. Examiner Band explained that he understands Kitani to teach that some smoothing can be obtained using the angles as claimed provided the surface (prior to smoothing) is sufficiently rough.

The undersigned posed an analogy of mountains and hills. The Examiner indicated it was an accurate summary of his views and that he would include it in his summary of the interview. The Examiner's summary of the Second Interview (mailed September 14, 2010) refers to an analogy and indicates it is an "accurate analogy for the teachings in Kitani, as given by the Applicant." The undersigned wishes to make clear that the analogy stated in the summary goes beyond what he said (he did not mention anything related to angles, for example) and he did not indicate it expresses what he or the Applicants believe is taught in Kitani. Instead, he presented an analogy as part of a discussion to confirm how the Examiner understands Kitani.

Discussion of Proposed Claim Rejections

The undersigned thanks Examiner Band for his courtesy in providing a copy of Kitani and for his willingness to hold two telephone interviews.

Examiner Band has not referred to Morimoto and Kools since the First Interview; therefore, the Applicants understand that the final rejection as set forth in the Office Action will be withdrawn but the Examiner intends to reject claim 1 using a new proposed ground of rejection as set forth in the Examiner's summary for the Second Interview if prosecution continues.

In an effort to advance prosecution, the Applicants direct the remainder of this response toward the Kitani reference and the proposed new ground of rejection.

Kitani discloses a study in which the sputtering effect of GCIB is analyzed for incident angles that range from normal to 60° from normal. The claimed method is limited to incident angles that are greater than 60° from normal (the claim language recites an angle formed between the surface and the GCIB that is less than thirty degrees). The following remarks refer to incident angles as measured from the normal.

The Applicants respectfully traverse the proposed rejection of the claims for each of two reasons: (1) the proposed rejection is based on an incorrect understanding of what is taught in Kitani, and (2) a proper showing has not been made to support a conclusion of obviousness.

Teachings in Kitani

The proposed rejection is based on an incorrect understanding of what is taught in Kitani. The summary of the Second Interview indicates that Kitani teaches:

> "… smoothing at an angle of greater than 45 degrees smoothes down the surface to the size of the 'Rockies' and smoothing at an angle less than 45 degrees smoothes down

the surface roughness to the size of the 'hills', thus Kitani teaches smoothing at an angle between 0 degrees and 90 degrees."

We respectfully disagree. Kitani instead illustrates and states the following:

> "For small incident angles (<30°), less smoothing effect was observed, and the saturated value of Ra is larger than 11 angst. For larger incident angles than 45°, the roughness increased with amount of irradiation." (see last paragraph of section 3 on page 491, emphasis added)

Kitani states roughness will increase for angles larger than 45°. This is the opposite of smoothing. It is not correct to conclude Kitani teaches smoothing at all angles as alleged in the summary of the Second Interview. The Applicant respectfully submits the following analogy for consideration:

> Kitani teaches that surface roughness the size of the 'Himalayas' will not decrease but instead will grow, perhaps to the size of the 'Olympus Mons' volcano on Mars or even greater, if the radiation angle is larger than 45 degrees.

Based on comments made during the Second Interview, the undersigned believes Examiner Band is of the opinion that it is possible to start with a surface that is so rough that smoothing by GCIB bombardment is inevitable even at angles greater than 60°. The Applicants respectfully submit that this is mere speculation and further point out that it is unsupported by known prior art. If this opinion is not based on speculation, then the Applicants request that the next communication describe this surface with enough detail so that it can be evaluated objectively.

Obviousness

Second, the proposed ground of rejection appears to omit an inquiry into what would have been obvious to a person of ordinary skill in the art and instead appears to rely on an inherency theory; namely, if the smoothing process starts with a surface that is rough enough, GCIB smoothing at larger angles is inevitable or inherent.

It may be useful to review the requirements for establishing inherency:

> "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" (MPEP 2163.07(a) quoting *In re Robertson*).

The Applicants respectfully submit that the alleged inherency in Kitani cannot be established.

An inquiry into obviousness should attempt to ascertain what a person with ordinary skill would have been motivated to do or at least try. Choosing a course of action that the prior art indicates will achieve the opposite of what is desired is the antithesis of obviousness.

Kitani and all other known prior art teach away from what is claimed. According to Kitani, if the radiation angle is greater than 45°, roughness increases. Kitani indicates this effect increases more rapidly with further increases in angle. If the skilled person wanted to smooth something, there would be no motivation to try angles larger than 45°. Kitani et al. already tried some of these larger angles and they reported very clearly that roughness increases.

Furthermore, even if we ignore what Kitani reports and assume instead that at least some smoothing can occur using larger angles for contrived situations, we still reach the same conclusion. The person with ordinary skill would not be motivated to use larger angles. To insist otherwise is to argue the skilled person would intentionally choose an inferior method. This argument turns the concept of obviousness on its head.

Dependent Claims 2-8

The rejection of all dependent claims relies on teachings in Morimoto for monomer ion beams and the alleged equivalence between monomer ion beams and GCIB. As noted above, the Applicants have successfully shown the prior art does not recognize the alleged equivalence. The prior art of record as well as Kitani do not teach the additional limitations recited in the dependent claims. The rejection of these claims should be withdrawn pending further examination.

CONCLUSION

Applicants cancel the withdrawn claims and request reconsideration of the remaining claims.

Respectfully submitted,

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